

STATE OF LOUISIANA AND THE	*	15TH JUDICIAL COURT
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VERMILION PARISH SCHOOL BOARD	*	PARISH OF VERMILION
	*	
VERSUS	*	STATE OF LOUISIANA
	*	
THE LOUISIANA LAND AND EXPLORATION	*	DOCKET NO. 82162
COMPANY, ET AL.	*	
	*	DIVISION "D"
	*	

SECOND SUPPLEMENTAL EXPERT REPORT

JOHN R. FRAZIER, Ph.D., CHP

I. INTRODUCTION

I have been retained by counsel for Defendants in the case of State of Louisiana and The Vermilion Parish School Board vs. The Louisiana Land and Exploration Company, et al. (Fifteenth Judicial District Court for the Parish of Vermilion, State of Louisiana, Docket Number 82162, Division "D"), to assess the radiological conditions of a specific parcel of land located in the East White Lake Field in Vermilion Parish, Louisiana. I have been asked to review data provided by Plaintiffs and Defendants in this matter. I have also been asked to determine whether any information and/or data pertaining to the subject property indicate the presence and extent of naturally occurring radioactive material (NORM) due to oil or gas production on the subject property. I prepared and submitted an expert report in this matter on June 15, 2010 (Frazier 2010). I also prepared and submitted a supplemental expert report in this matter on June 4, 2014 (Frazier 2014). Since submission of my supplemental report additional documents relevant to the case have been produced. This report is a second supplement to my earlier reports and presents my opinions based on my review of those additional documents.

II. OPINIONS

Based on the information that I have reviewed since submission of my June 4, 2014 supplemental expert report in this matter I have reached the following conclusions with a reasonable degree of scientific certainty:

1. My opinions contained in my June 15, 2010 report and in my June 4, 2014 supplemental report in this matter are unchanged. The information relevant to

the case that I have reviewed since submission of my June 4, 2014 supplemental report affirms my previous opinions.

2. Groundwater samples collected from the subject property since my June 4, 2014 supplemental report and analyzed for radionuclides show concentrations of NORM radionuclides (Ra-226 and Ra-228) that are consistent with natural background concentrations in groundwater and not oil field NORM.
3. Plaintiffs' experts Gregory W. Miller, Charles R. Norman, and Paul H. Templet do not present any radiological measurement data in their January 15, 2015 reports to support claims of NORM impacts on the subject property.

III. QUALIFICATIONS

My qualifications are detailed in my current Curriculum Vitae (included as Attachment A). My area of expertise is health physics – the scientific discipline of measuring radiation and protecting people from the harmful effects caused by high doses of radiation. I have over thirty-seven years of professional experience in health physics, primarily in the areas of environmental dose assessments, external and internal radiation dosimetry, environmental sampling and analysis, and radiation detection and measurement. I earned Comprehensive Certification by the American Board of Health Physics (ABHP) in 1981 and have maintained that certification through 2017. I am a Diplomate and Past-president of the American Academy of Health Physics. The term "Certified Health Physicist" is a certification mark that may only be used by individuals who have received Comprehensive Certification by the ABHP. Certification in health physics by the ABHP is the same as professional certification by other recognized professional organizations, such as certification in diagnostic radiological physics by the American Board of Radiology. I am a Distinguished Emeritus member of the National Council on Radiation Protection and Measurements (NCRP) and a Fellow and Past-president of the Health Physics Society. Over the past twenty-one years I have performed radiological assessments of several properties impacted by oil field NORM. I have also evaluated current and past radiation exposure conditions on properties impacted by oil field NORM. My qualifications are also summarized in my June 15, 2010 report in this case.

IV. BASIS OF OPINIONS

Since submission of my June 4, 2014 supplemental report in this case I have reviewed additional documents related to the East White Lake Field. In addition to the documents that I reviewed in preparation for my two previous reports in this case, I have also reviewed the additional documents listed in Attachment B in preparation of this second supplemental report.

A. Collection and Analysis of Groundwater Samples from the Subject Property since June 4, 2014

One sample of groundwater was collected from the subject property on January 7, 2015, by plaintiffs' representative, ICON Environmental Services, Inc. (ICON), from ICON location "WL-6" (MP&A 2015). The sample was shipped under chain of custody to an off-site laboratory, Pace Analytical Services, Inc. (Pace), for analysis of concentrations of Ra-226 and Ra-228. Results of radiological analysis of the sample were reported by Pace on January 20, 2015 (Pace 2015). A part of the sample from "WL-6" was analyzed at another laboratory for ICON for non-radiological parameters (e.g., total dissolved solids [TDS]) (MP&A 2015).

A split sample of groundwater from location "WL-6" was collected at the same time by defendants' representative, Michael Pisani & Associates (MP&A), and shipped under chain of custody to another off-site laboratory, Eberline Analytical Corporation (Eberline), for analysis of concentrations of Ra-226, Ra-228, and TDS. Results of Eberline's analyses were reported on February 4, 2015 for the sample and for a laboratory duplicate of the sample (Eberline 2015).

The concentrations of Ra-226 and Ra-228 in the sample analyzed by Pace and in the two samples (including the laboratory duplicate) analyzed by Eberline are within the range of natural background concentrations of these radionuclides in Louisiana groundwater having the measured amounts of solids (TDS) and do not indicate the presence of oil field NORM in the groundwater. The relative concentrations of Ra-226 to Ra-228 in the sample analyzed by Pace differ more than would be expected for these radionuclides in native Louisiana soils/solids. However, both samples analyzed by Eberline show the relative concentrations of Ra-226 and Ra-228 to be consistent with the relative concentrations of these radionuclides in native Louisiana soils/solids.

In summary, the totality of data for groundwater samples collected from the subject property and analyzed for radionuclides show concentrations of NORM radionuclides (Ra-226 and Ra-228) that are consistent with natural background concentrations in groundwater and not oil field NORM.

B. Review of Supplemental Reports by Gregory W. Miller, Charles R. Norman, and Paul H. Templet

I have reviewed three supplemental reports from Plaintiffs' experts in this case, each report dated January 15, 2015. Those reports are produced by Gregory W. Miller (Miller 2015), Charles R. Norman (Norman 2015), and Paul H. Templet (Templet 2015). The opinions listed by Miller in his recent report do not include any claims of NORM impacts on the subject property (Miller 2015). Additionally, Miller does not present in his report any environmental measurement data pertaining to NORM measurements that were not already presented in his previous reports in this case.

As with Miller, Norman does not opine in his January 15, 2015 report that the site has any NORM impacts. Also like Miller, Norman does not present any environmental measurement data pertaining to NORM measurements (Norman 2015).

In his January 15, 2015 report, Templet restates his opinion from his April 6, 2010 report that the site is contaminated with radionuclides (Templet). However, as with his 2010 report in this case Templet does not present any environmental measurement data to support his opinion that there is NORM contamination on the subject property (Templet 2015).

The observations, conclusions, and opinions noted in this report are based on my personal knowledge and experience and are consistent with accepted practice in the field of health physics. I reserve the right to amend this report should additional data or other information become available to me in the future.

V. RATE OF COMPENSATION

I am currently being compensated at a rate of \$250. per hour for my time to work on this project.

VI. PRIOR TESTIMONY

A list of cases in which I have given sworn testimony at deposition or at trial since submittal of my June 4, 2014 supplemental report is included in Attachment C.

Prepared and submitted by:



John R. Frazier, Ph.D., CHP

Date: February 16, 2015

ATTACHMENT A
CURRICULUM VITAE OF JOHN R. FRAZIER, Ph.D., CHP

JOHN R. FRAZIER, Ph.D., CHP

Professional Qualifications

Dr. Frazier has over 37 years of health physics experience in external and internal dosimetry, environmental dose assessment, radiation risk assessment, radiation spectroscopy, health physics training, bioassay, radiation detection and measurement, and radiological site characterization. Numerous federal agencies including the Nuclear Regulatory Commission (NRC), Environmental Protection Agency (EPA), U.S. Department of Agriculture (USDA), U.S. Department of Defense (DOD), and U.S. Department of Justice (DOJ) have sought his advice on a wide range of health physics and radiation protection topics from operational health physics program design to environmental radiation dose and risk assessments. He has also served as a consultant to private companies and individuals on numerous health physics issues. He is a Distinguished Emeritus Member of the National Council on Radiation Protection and Measurements (NCRP). Dr. Frazier has made presentations on introductory and advanced health physics and radiation protection topics for professional society meetings, student groups, and public interest forums. His publications are in the areas of fundamental interactions of radiation with matter, radiation detection instrumentation, radiological site assessments, and external and internal radiation dosimetry.

Education

Ph.D., Physics, University of Tennessee, Knoxville, Tennessee; 1978.

M.S., Physics, University of Tennessee, Knoxville, Tennessee; 1973.

B.A., Physics, Berea College, Berea, Kentucky; 1970.

Registrations/Certifications

Certification by the American Board of Health Physics in 1981; recertified through 2017.

Experience and Background

2004 - *Independent Health Physics Consultant*
Present

Dr. Frazier provides consultation services to individuals, private companies, and government agencies on a wide range of radiation protection topics. His principal areas of expertise are internal and external radiation exposure assessments, environmental radiation dose and radiological risk assessments from occupational and environmental exposures, and evaluations and assessments of all aspects of operational health physics programs.

1993 - ***Senior Radiological Scientist, Auxier & Associates, Inc., Knoxville, Tennessee.***
2004

Dr. Frazier served as senior consultant on radiation protection issues for private companies and government agencies. He performed assessments of internal and external radiation exposures, environmental radiation doses and radiological risks from occupational and environmental exposures. He also performed evaluations and assessments of all aspects of operational health physics programs. Dr. Frazier served as technical advisor to organizations that performed environmental radiological assessments and risk assessments and that provided occupational radiation protection services in government and industry.

1986 - ***Senior Radiological Scientist, Nuclear Sciences, IT Corporation, Knoxville, Tennessee.***
1993

Dr. Frazier served as senior radiological scientist and technical manager of the health physics consulting group within IT. He was responsible for health physics professional services provided by IT for federal, state, and local agencies, contractors, and private companies. These services included development of all aspects of the health physics programs for nuclear facilities, technical assessments and evaluations of existing health physics programs, and environmental and occupational radiation dose assessments. He served as technical advisor and task manager for radiological aspects of remedial investigations and feasibility studies (RI/FSs). He also served as manager and technical director for specific projects in areas that included design and implementation of environmental monitoring and sampling programs, assessment of operational health physics programs, and radiation dose and risk assessments for occupational exposures and environmental releases. Previous responsibilities included serving as senior technical consultant for upgrading Environmental Health and Safety Programs at the Department of Energy Rocky Flats Plant, Oak Ridge National Laboratory, and the Oak Ridge Y-12 Plant.

1980 - ***Health Physicist, Oak Ridge Associated Universities, Oak Ridge, Tennessee.***
1986

Dr. Frazier developed and coordinated Oak Ridge Associated Universities (ORAU) health physics training programs. He taught health physics and radiation protection courses for several hundred students each year at ORAU Professional Training Programs. He developed new lectures, laboratory exercises, and training materials for health physics training for the Nuclear Regulatory Commission, Department of Energy, and corporate clients. In addition to his training responsibilities, Dr. Frazier served as division health physicist for the Manpower Education, Research, and Training Division of ORAU. He served as technical consultant to federal and state agencies, other training institutions, and ORAU clientele on environmental, health and safety issues. He evaluated radiation measurement and radiation protection instrumentation equipment.

- 1978 - ***Chief Radiation Physics Section, Bureau of Radiological Health, Rockville, Maryland.***
 1980
 Dr. Frazier supervised research and support activities of a staff of seven health physics professionals and technicians. He planned and implemented radiation research projects pertaining to ionizing radiation detection/ measurement. He scheduled personnel requirements in accordance with the scope of such projects. He coordinated support for external radiation dosimetry by the Radiation Physics Section for all other branches in the Division of Electronic Products. He supervised and performed multi-point calibrations of radiation detection/ measurement instruments per month. Dr. Frazier also assisted in planning radiation dosimetric surveys of large numbers and types of ionizing radiation sources to reduce population exposure. He coordinated environmental radiation dosimetry for extended geographical areas using external radiation dosimeters.
- 1977- ***Research Physicist, Bureau of Radiological Health, Rockville, Maryland.***
 1980
 Dr. Frazier calibrated X-ray detection/measurement instruments. He maintained radiation calibration secondary standards traceable to the National Bureau of Standards. He evaluated new X-Ray detection/measurement instruments with radio-frequency fields under controlled environmental conditions and a wide range of ionizing radiation fields. He also developed external radiation dosimetry techniques with both active and passive dosimeters.

Awards/Activities

Fellow, Health Physics Society, 2000
 Elda E. Anderson Award, Health Physics Society, 1988
 John C. Villforth Lecture, Conference of Radiation Control Program Directors (CRCPD), 2007
 Distinguished Technical Associate, IT Corporation, 1990
 National Council on Radiation Protection and Measurements (NCRP)
 Distinguished Emeritus Member, 2014
 Council Member, 2002-2014
 Scientific Committee 46, 1999-2006
 Scientific Committee 2-1, 2004-2006
 PAC 2 Committee 2006-2015

Professional Affiliations

Health Physics Society
 (Plenary Membership since 1981; President, 2002-3; President-Elect, 2001-2;
 Board of Directors, 1992-5; Treasurer-Elect, 1997-8; Treasurer, 1998-2000)
 American Academy of Health Physics (Past-president, 2013; President, 2012;
 President-elect, 2011; Secretary, 1996-1997; Director, 1998)
 East Tennessee Chapter of the Health Physics Society (Past President)
 International Radiation Protection Association (Plenary Membership)

Publications

Dr. Frazier has prepared or contributed to over 100 reports and publications in the fields of health physics and environmental science.

List of Publications

Frazier, J. R., "Negative Ion Resonances in the Fluorobenzenes and Biphenyl" Ph.D. Dissertation, University of Tennessee, Knoxville, Tennessee, 1978.

Frazier, J. R., "Low-Energy Electron Interactions with Organic Molecules: Negative Ion States of Fluorobenzenes," Journal of Chemical Physics, Vol. 69, No. 3807, 1978.

Frazier, J. R., "Performances of X-ray Measurement Instruments in RF Fields," HEW Publication (FDA) 78-8065 Rockville, Maryland, 1978.

Frazier, J. R., "A Dosimetry System for Evaluating Chest X-Ray Exposures," HEW Publication (FDA) 79-I 107, 1979.

Film Badge Dosimetry in Atmospheric Nuclear Tests, National Academy Press, Washington, D.C., 1989.

Key Elements of Preparing Emergency Responders for Nuclear and Radiological Terrorism, NCRP Commentary No. 19, Bethesda, MD, December 31, 2005.

Radiation Protection in Educational Institutions, NCRP Report No. 157, National Council on Radiation Protection and Measurements, Bethesda, MD, June 25, 2007.

Self Assessment of Radiation-Safety Programs, NCRP Report No. 162, National Council on Radiation Protection and Measurements, Bethesda, MD, June 3, 2009.

Investigation of Radiological Incidents, NCRP Report No. 173, National Council on Radiation Protection and Measurements, Bethesda, MD, September 14, 2012.

ATTACHMENT B

LIST OF DOCUMENTS REVIEWED SINCE JUNE 4, 2014

ATTACHMENT B

Documents Reviewed by John R. Frazier, Ph.D., CHP

Eberline 2015 Eberline Services/Oak Ridge Laboratory, Standard Level IV Report of Analysis, Work Order #15-01043-OR, Oak Ridge, Tennessee, February 4, 2015.

Frazier 2010 Frazier, John R., “Expert Report of John R. Frazier, Ph.D., CHP,” Knoxville, Tennessee, June 15, 2010.

Frazier 2014 Frazier, John R., “Supplemental Expert Report,” Knoxville, Tennessee, June 4, 2014.

Miller 2015 Miller, Gregory W., “Supplemental Report and Opinions; Vermilion Parish School Board, East White Lake Field; State of Louisiana and the Vermilion Parish School Board v Louisiana Land and Exploration, et al, Docket No. 82162, Div D, 15th JDC”, ICON Environmental Services, Inc., Port Allen, LA, January 15, 2015.

MP&A 2015 Michael Pisani & Associates (MP&A), Data Table – 2015 Groundwater Sampling and Figures 1 & 5 – Sample Locations, New Orleans, Louisiana, 2015.

Newpark 1999 Newpark Environmental Services, “Environmental Assessment Report, Carrollton Resources Oil and Gas Production Facilities Southern Louisiana,” Lafayette, Louisiana, April 1999.

Norman 2015 Norman, Charles R., “Engineering and Operations Report on East White Lake Field Operated by LL & E et al, Vermilion Parish, LA; Report No. 2”, Vermilion Parish, Louisiana, January 15, 2015.

Pace 2015 Pace Analytical Services, Inc., Letter Report of Analysis, Project: East White Lake, Pace Project No. 30138641, Greensburg, Pennsylvania, January 30, 2015.

Templet 2015 Templet, Paul H., “A Supplemental Expert Report by Paul H. Templet, Ph.D.; VPSB v. Louisiana Land & Exploration, et al.; East White Lake Field, Vermilion Parish,” Baton Rouge, Louisiana, January 15, 2015.

Miscellaneous Documents:

Bates Numbers: EWL_MP&A_2014 1-6280

ATTACHMENT C
TESTIMONY SINCE JUNE 4, 2014

**LITIGATION IN WHICH DR. JOHN R. FRAZIER HAS PROVIDED SWORN
TESTIMONY SINCE JUNE 4, 2014**

<u>LAW FIRM</u>	<u>CASE</u>	<u>CLIENT</u>	<u>DATE</u>
Liskow & Lewis	Agri-South Group, LLC, et al. v. Exxon Mobil Corporation, et al.	Exxon Mobil Corporation, et al.	August 20, 2014
Kean Miller	State of Louisiana Vermilion Parish School Board v. Louisiana Land & Exploration Company	UNOCAL	September 16, 2014
Jeansonne & Remondet	Clyde A. Tucker, et al. v. Shell Oil Company, et al.	Murphy Oil	December 17, 2014